(53) $\int_0^{\pi/4} \cos 2x dx = \left[\frac{1}{2}\sin 2x\right]_0^{\pi/4} = \frac{1}{2}(1-0) = \frac{1}{2}$

(55) $\int_0^1 xe^{-x^2} dx$

let $u = -x^2 \Rightarrow du = -2xdx$

Converting the limits of integration

$u(0) = 0,\ u(1) = -1$

$\therefore \int_0^1 xe^{-x^2} dx = -\frac{1}{2}\int_{u=0}^{u=-1} e^u du = -\frac{1}{2}\left[e^u\right]_0^{-1} = -\frac{1}{2}\left[\frac{1}{e} - 1\right]$

(57) $\int_0^4 \frac{2x}{\sqrt{x^2 + 3^2}} dx$

Let $u = x^2 + 9 \Rightarrow du = 2xdx$

Converting the limits of integration

$u(0) = 9,\ u(4) = 25$

$\therefore \int_0^4 \frac{2x}{\sqrt{x^2+3^2}} dx = \int_{u=9}^{25} \frac{du}{\sqrt{u}} = 2\left[u^{(1/2)}\right]_9^{25} = 2(5-3) = 4$